



# Harnessing Artificial Intelligence to Achieve Sustainable Development Goals: Opportunities, Challenges, and Ethical Considerations

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## **Author's contribution**

The sole author designed, analysed, interpreted and prepared the manuscript.

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## **ABSTRACT**

This critical analysis examines the role of artificial intelligence (AI) in attaining the Sustainable Development Goals (SDGs), emphasizing its potential advantages and related problems. AI technologies can markedly improve resource efficiency, optimize public service delivery, and stimulate economic growth and development, thereby advancing multiple Sustainable Development Goals (SDGs), including poverty alleviation, responsible consumption and sustainable urban development. The incorporation of artificial intelligence brings ethical challenges, including the potential for perpetuating biases and aggravating inequality, which may impede progress toward sustainable development. This assessment underscores the necessity of responsible deployment of Artificial Intelligence, promoting strong governance frameworks, collaborative efforts among

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multiple stakeholders, and focused investments in education and capacity building to minimize poverty significantly. By connecting artificial intelligence research and uses with the Sustainable Development Goals and ensuring equal access to its advantages, stakeholders may leverage AI as a potent instrument for sustainable development. In conclusion, leveraging the revolutionary potential of AI for sustainable development necessitates a multi-stakeholder approach that includes governments, researchers, civil society, and the corporate sector. This collaboration must emphasize the establishment of strong governance frameworks, the involvement of data management specialists, the assurance of algorithmic transparency and accountability, and the facilitation of equal access to AI technologies. This study ultimately advocated for a balanced strategy that optimizes the beneficial effects of AI while mitigating its problems to promote a more sustainable and equitable future for all citizens.

*Keywords: Artificial intelligence; sustainable development goals; poverty alleviation; inequality reduction; decent employment and economic advancement.*

## 1. INTRODUCTION

Within the framework of the United Nations Sustainable Development Goals (SDGs), Artificial Intelligence (AI) is increasingly recognized as a formidable instrument for addressing pressing global challenges. Founded in 2015, the Sustainable Development Goals (SDGs) comprise 17 objectives aimed at fostering a sustainable and equitable future by 2030. These objectives address issues like as poverty, inequality, climate change, and environmental degradation (UN, 2023). The approaching deadline for achieving these objectives necessitates the integration of artificial intelligence (AI) into sustainable development strategies. This integration offers innovative solutions to complex problems and enhances data-driven decision-making techniques. The potential of AI to aid in achieving the Sustainable Development Goals (SDGs) is multifaceted. Through the analysis of huge datasets, one can discern patterns and insights that may inform policy decisions, hence improving the effectiveness of programs aimed at achieving the Sustainable Development Goals (Frais, 2024). In healthcare, AI technology can improve diagnosis, treatment planning, and patient monitoring, so directly contributing to SDG 3, which aims to ensure healthy lives and promote well-being for everyone (UN, 2023).

Utilizing predictive analytics, AI can identify disease outbreaks and recommend preventive measures, hence improving public health outcomes. Moreover, artificial intelligence plays a vital role in climate action (SDG 13). Artificial intelligence can forecast meteorological trends, assess the impacts of climate change, and enhance the efficiency of renewable energy resource utilization through the analysis of

climatic data (Frais, 2024). This competence is essential for developing sustainable resource management and catastrophe risk reduction strategies aligned with the global drive to combat climate change.

Moreover, AI possesses the capacity to enhance educational results (SDG 4) by individualizing learning experiences, therefore fostering lifelong learning opportunities and improving access to excellent education for all. Nonetheless, the integration of AI into sustainable development programs presents some challenges. To ensure the correct utilization of AI technology, it is essential to confront ethical considerations, data privacy issues, and the possibility for intensifying existing inequities (UN, 2024). The United Nations has emphasized the importance of developing AI systems that are safe, secure, trustworthy, inclusive, and respectful of human rights (UN, 2024). This involves fostering collaboration among diverse stakeholders, including governments, the commercial sector, and civil society, while ensuring fair access to AI tools and infrastructure.

The capacity of AI to eliminate digital gaps and support underdeveloped nations in achieving sustainable development is particularly significant. Nations should use the benefits of digital transformation by promoting capacity development and providing access to AI technology, therefore encouraging equitable innovation and growth (UN, 2024). The UN's recent resolution on AI (UN, in 2024) underscores the imperative for a coordinated global strategy in AI regulation, aimed at optimizing its advantages while mitigating related risks. Artificial Intelligence has a substantial opportunity to accelerate advancement towards the Sustainable Development Goals by

enhancing decision-making, promoting innovation, and tackling pressing global challenges. Nonetheless, actualizing this potential necessitates a dedication to ethical practices, inclusive policies, and cooperative endeavors across sectors. It is essential to utilize AI responsibly, guaranteeing equitable distribution of its advantages and ensuring it functions as a means for sustainable development rather than a catalyst for divide or inequality.

## 2. REVIEW OF RELATED LITERATURE

### 2.1 Sustainable Development Goals

The United Nations instituted the Sustainable Development Goals (SDGs) in 2015 as a global imperative for action. The Sustainable Development Goals aim to tackle global concerns such as poverty, inequality, and climate change by the year 2030. The Sustainable Development Goals (SDGs) are 17 interrelated objectives designed to establish a comprehensive framework for environmental conservation and the advancement of prosperity (United Nations, 2024). The 2024 Sustainable Development Goals Report reveals that merely 17% of the aims are progressing as planned, hindered by substantial setbacks from the COVID-19 pandemic, geopolitical conflicts, and climatic emergencies, notwithstanding the ambitious agenda (United Nations, 2024). The main issues include the intensifying effects of climate change, insufficient advancements in gender equality, and rising disparities (Sachs et al., 2024). Coordinated actions are essential to realize the SDGs, encompassing the deployment of novel strategies to enhance sustainability and resilience, the fortification of global alliances, and the provision of supplementary financial resources to developing nations (UNDP, 2024). The 2030 Agenda is a collaborative effort to create a more sustainable and equitable global society, and adherence to it remains crucial.

Artificial Intelligence and Sustainable Development Objectives. The United Nations Sustainable Development Goals (SDGs), instituted in 2015 to address pressing global issues by 2030, are increasingly recognized as an essential instrument for their promotion. Artificial Intelligence (AI) is an essential element of this project. The SDGs include several aims, such as poverty eradication, excellent education provision, health and well-being promotion, and climate change mitigation. The incorporation of

AI into sustainable development strategies has attracted significant attention as the deadline for achieving these goals nears, owing to its ability to optimize resource allocation, promote innovative solutions across diverse sectors, and improve data analysis (Frais,2024; UN,2023).

The seventeen Sustainable Development Goals (SDGs) are designed to be interconnected and holistic, recognizing that interventions in one domain can affect results in others. The alleviation of poverty (Goal 1) can positively impact health (Goal 3) and education (Goal 4). This interdependence highlights the imperative for holistic development policies that achieve equilibrium among environmental, economic, and social sustainability (United Nations, 2023). The SDGs require a cooperative effort from all societal sectors, including the commercial sector, civil society, and governments. To promote sustainable development projects, especially in developing countries, it is essential to deploy financial resources, technology, and expertise (United Nations Development Programme, 2024). The SDGs provide a holistic framework for addressing the most pressing challenges facing humanity today. They provide a framework for the creation of a more sustainable, egalitarian, and affluent world by 2030.

### 2.2 The Role of AI in Achieving Sustainable Development Goals

By offering sophisticated analytical skills that facilitate improved decision-making and focused interventions, AI technologies can make a substantial contribution to various Sustainable Development Goals (SDGs). In the healthcare sector, artificial intelligence (AI) technologies are transforming diagnoses and treatment planning, therefore contributing to the achievement of Sustainable Development Goal 3 (Good Health and Well-Being). Advanced artificial intelligence (AI) systems have the capability to examine extensive quantities of medical data in order to detect illness trends, forecast outbreaks, and suggest preventive actions, thereby improving the accessibility and quality of healthcare (Gosselink et al., 2023). It is especially vital in low- and middle-income nations, where healthcare resources are frequently constrained. Within the field of education, artificial intelligence (AI) is revolutionizing the process of learning by customizing instructional material to cater to the specific requirements of each student, therefore furthering the achievement of Sustainable Development Goal 4 (Quality Education). The

utilization of artificial intelligence in adaptive learning systems enables the real-time evaluation of students' progress and the provision of customized feedback, hence enhancing engagement and learning results (UN, 2023).

Furthermore, this technology not only improves educational accessibility but also provides learners with the necessary skills for future employment markets. Artificial Intelligence's capacities also encompass environmental sustainability, effectively contributing to the mitigation of climate change (SDG 13). By analyzing climate data, artificial intelligence (AI) can forecast weather patterns, evaluate environmental consequences, and enhance the efficiency of renewable energy use. AI-powered models can enhance the creation of more efficient disaster risk reduction methodologies and sustainable agriculture techniques, in line with worldwide endeavours to address climate change (Gosselink et al., 2023; Fraiss, 2024). Artificial intelligence (AI) has significant capacity to expedite advancements towards the Sustainable Development Goals (SDGs) by improving decision-making, stimulating innovation, and tackling intricate global issues. However, harnessing this potential necessitates a dedication to ethical principles, comprehensive policies, and cooperative endeavours spanning several industries. In order to fully use the potential of AI, it is crucial to embrace a multi-stakeholder strategy that guarantees the equitable distribution of its advantages and the efficient management of its constraints. By adopting this approach, we can optimize the role of AI in promoting sustainable development, therefore establishing a fairer, more robust, and affluent global society for everyone.

### **2.3 Challenges and Ethical Considerations in AI**

Despite the significant potential of AI, its integration into sustainable development programs is fraught with challenges. To guarantee the responsible implementation of AI technology, it is essential to confront ethical issues such as data privacy, algorithmic bias, and the possible exacerbation of existing inequalities (Fraiss, 2024; UN, 2023). The digital divide is a significant barrier, particularly in developing nations where access to AI technology and the necessary infrastructure may be limited. Insufficient management of AI implementation may exacerbate disparities

between states capable of fully using these technologies and those that are not (Gosselink et al., 2023). Furthermore, there is an immediate necessity for extensive AI governance frameworks that prioritize human rights and ethical standards in the creation and execution of AI. The United Nations has emphasized the necessity of collaboration among governments, the private sector, and civil society to design policies that ensure equitable access to the benefits of artificial intelligence while mitigating associated risks (UN, 2023).

### **2.4 Impact of AI Adoption on Cities and Communities**

Local governments are swiftly adopting AI technologies to enhance administrative processes, improve decision-making, and expand service delivery. Yigitcanlar et al. (2024) emphasize the significance of local governments employing artificial intelligence (AI) for many operational functions, including infrastructure development and transportation optimization. This integration facilitates more efficient urban planning and resource allocation, hence promoting the creation of smart cities that can more effectively meet inhabitants' needs (Yigitcanlar et al., 2024). Applications of artificial intelligence (AI) in urban settings involve the improvement of public services, such as healthcare, waste management, and public safety. UN-Habitat (2022) asserts that artificial intelligence (AI) can address major urban challenges by enhancing service delivery efficiency and elevating the general welfare of residents. The utilization of predictive analytics in public health enables the forecasting of disease outbreaks, hence easing the execution of preemptive interventions to safeguard community health. The integration of artificial intelligence is considered a significant catalyst for economic growth. As urban areas adopt artificial intelligence (AI) technology, they attract investments and foster innovation ecosystems capable of creating employment opportunities and enhancing economic resilience. The World Economic Forum (2024) underscores that cities are formulating legislation to oversee AI usage, so facilitating the harnessing of its economic potential while maintaining ethical norms. The influence of AI implementation on urban areas and communities is complex, presenting considerable prospects for enhancement as well as substantial issues that require resolution (National League of Cities, 2024). As metropolitan regions increasingly incorporate AI

into their governance and service delivery systems, it is crucial to emphasize ethical considerations, inclusion, and the reduction of biases. Implementing robust governance frameworks will be essential for ensuring that AI technologies enhance urban life while protecting the rights and welfare of all community members. Adopting AI in cities and communities entails inherent dangers:

- **Inequities and Prejudice**

A primary concern with AI implementation in urban settings is the potential to intensify existing disparities. Artificial intelligence systems frequently mirror the biases inherent in their training data, resulting in discriminatory consequences in domains such as law enforcement and resource distribution (UN-Habitat, 2022). Literature suggests that inadequate governance of AI may exacerbate societal imbalances instead of mitigating them (Ben et al., 2023).

- **Confidentiality and Monitoring**

The implementation of AI technologies presents significant concerns regarding privacy and monitoring. Numerous AI uses, especially in public safety and urban monitoring, may result in invasive surveillance methods that violate individual rights. The UN-Habitat study emphasizes the necessity of creating strong governance frameworks to alleviate these dangers and safeguard citizens' rights (UN-Habitat, 2022).

- **Obstacles to Implementation**

Notwithstanding the prospective advantages, numerous obstacles impede the extensive implementation of AI in smart cities. Ben et al. (2023) identify the lack of technical skills, inadequate infrastructure, and opposition to change as major impediments. Addressing these obstacles is crucial for cities seeking to fully harness the benefits of AI technologies.

## 2.5 Artificial Intelligence as a Catalyst for Mitigating Inequality

Artificial intelligence (AI) has the capacity to act as a significant catalyst for diminishing inequality across multiple societal dimensions, including environmental, technological, economic, educational, and social disadvantages. By leveraging its strengths, AI can augment resource accessibility, generate employment possibilities, enhance efficiency, and foster inclusion, so addressing systemic injustices.

## 3. ECONOMIC EMPOWERMENT THROUGH ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI) can significantly enhance economic empowerment by providing targeted assistance to disadvantaged regions. In the context of disasters such as earthquakes, hurricanes, and cyclones, predictive analytics can aid companies in pinpointing the precise locations where resources are most needed. This facilitates a more effective allocation of assistance (Quantilus, 2024). This proactive technique enables timely actions to alleviate the impact of economic shocks on vulnerable groups. Moreover, AI technologies possess the capacity to democratize access to work opportunities. AI-driven recruitment solutions facilitate the mitigation of biases in hiring processes, so fostering equitable job possibilities for candidates from diverse backgrounds and ensuring the selection of the most competent individuals (Quantilus, 2024). Artificial intelligence can analyze job descriptions to eliminate gender-specific language, which has been shown to deter women from applying for certain positions (Hello Future, 2024). This transformation boosts workforce diversity and fosters economic participation among underrepresented groups. It does this by;

- ❖ **Improving Educational Accessibility**

Artificial intelligence (AI) can play a crucial role in improving educational accessibility and outcomes. Artificial intelligence-driven personalized learning systems can adapt to the unique needs of individual students, hence providing tailored educational experiences that cater to diverse learning preferences (Hello Future, 2024). This method is particularly beneficial for students from disadvantaged backgrounds who may lack access to high-quality educational resources. By enabling tailored learning pathways, artificial intelligence (AI) can reduce educational inequity, equipping all students with the necessary skills for future jobs. Furthermore, AI can enhance the accessibility of higher education by deploying programs that identify and support students at a heightened risk of attrition. Artificial intelligence systems can analyze student data to identify individuals who may require additional support, allowing institutions to intervene early and provide necessary resources (Quantilus, 2024). Executing this

targeted method can aid in retaining students who might otherwise face challenges in completing their degree.

❖ **Advancing Social Inclusion**

The function of AI in fostering social inclusion is significant. Through the formulation of algorithms that actively counteract discrimination, AI can facilitate the establishment of equitable systems across multiple sectors, including healthcare and employment. AI can be employed to guarantee fair access to healthcare services by finding and rectifying discrepancies in treatment availability for minority populations (Hello Future, 2024). This may result in enhanced health outcomes and a decrease in health-related disparities. Generative AI have the capacity to equalize the labor market by equipping lower-skilled individuals with tools that augment their production. Studies indicate that generative AI could preferentially advantage individuals with limited experience, thereby narrowing pay inequalities over time (Wilmers, 2024). This may undermine conventional meritocratic regimes that typically advantage highly educated persons, hence promoting a more egalitarian job market.

#### **4. CHALLENGES AND CONSIDERATIONS RELATED TO MITIGATING INEQUALITY**

Considering the significant potential of AI to reduce inequality, it is essential to meticulously examine the inherent risks associated with its implementation. In the absence of thorough design and oversight, AI systems may perpetuate existing biases (Hello Future, 2024). Therefore, it is essential to provide algorithmic transparency and accountability to prevent the exacerbation of inequities. Moreover, the implementation of AI must be supported by robust governance frameworks that prioritize ethical considerations and promote diversity. Policymakers must engage in dialogues with diverse stakeholders to guarantee that artificial intelligence development aligns with societal values and human rights (UN-Habitat, 2022). Artificial Intelligence (AI) possesses significant potential to reduce inequality across various industries. Artificial Intelligence (AI) possesses the capacity to promote a more equitable society by improving economic opportunities, increasing educational accessible, and facilitating social integration. To properly utilize this capacity, it is essential to

meticulously and ethically confront the challenges associated with the integration of artificial intelligence. The training of artificial intelligence (AI) systems may lead to the incorporation of human biases. Nonetheless, it is possible to create automated training models designed to rectify discrepancies.

#### **5. DECENT EMPLOYMENT AND ECONOMIC ADVANCEMENT: THE CATALYTIC FUNCTION OF ARTIFICIAL INTELLIGENCE**

The emergence of artificial intelligence (AI) is anticipated to significantly impact quality employment and economic advancement, presenting both opportunities and challenges. As artificial intelligence (AI) technologies advance, they have the potential to enhance productivity, efficiency, provide new job opportunities, and transform existing professions. These modifications, however, also involve dangers that could exacerbate inequalities and disturb labor markets. An intrinsic benefit of employing AI is its capacity to improve efficiencies in specific sectors. The International Monetary Fund (2024) asserts that artificial intelligence (AI) can enhance labor efficiency, particularly in small and medium enterprises (SMEs), by automating repetitive tasks and allowing human workers to focus on more complex, value-added endeavors. This transformation not only improves efficiency but also has the ability to foster economic growth. Forecasts suggest that artificial intelligence (AI) might provide an additional \$13 trillion to the global economy by 2030 (McKinsey Global Institute, 2024). This level of economic growth is crucial for achieving sustainable development goals, as it can provide the necessary funding for social programs and infrastructure investments. Moreover, artificial intelligence possesses the ability to create unprecedented career categories. As organizations adopt artificial intelligence (AI) technology, there is an anticipated demand for skilled individuals who can build, manage, and maintain these systems (World Economic Forum, 2024). This alteration may lead to the creation of roles focused on AI ethics, data analysis, and machine learning, thereby augmenting the diversity of the labor market. Nonetheless, the integration of artificial intelligence also poses significant challenges. The primary issue is the potential for job displacement, particularly among low-skilled individuals in routine jobs that are more susceptible to automation (IMF, 2024).

Without adaptability to new roles, AI-related unemployment and wage stagnation continue. The World Economic Forum (2024) emphasizes the necessity of implementing reskilling and upskilling initiatives to properly prepare the workforce for the transition to an artificial intelligence (AI)-driven economy.

Moreover, the benefits of AI may not be evenly distributed, hence intensifying the income discrepancy between affluent and impoverished persons. If artificial intelligence (AI) disproportionately benefits individuals in highly skilled professions, it may exacerbate existing inequalities in labor markets (IMF, 2024). To address these disparities, authorities must establish comprehensive social safety nets and retraining programs to ensure that all workers benefit from the economic growth driven by AI. Considering the significant potential of AI to enhance labor conditions and foster economic development, it is imperative to proactively tackle the associated challenges. By allocating resources to education, reskilling initiatives, and equitable policies, many stakeholders can successfully harness the transformative potential of artificial intelligence to promote sustainable development and encourage inclusive economic growth.

## **6. ARTIFICIAL INTELLIGENCE AS A MEANS FOR RESPONSIBLE CONSUMPTION AND PRODUCTION**

Artificial intelligence (AI) can substantially enhance responsible consumption and production, in accordance with the United Nations Sustainable Development Goal 12 (SDG 12). AI technologies can promote sustainable behaviors across multiple sectors by optimizing resource utilization and improving efficiency. A principal application of AI is in supply chain management, where it can analyze data to reduce waste and enhance resource allocation. AI-driven analytics can forecast demand trends, enabling enterprises to modify output levels and mitigate overproduction (Panigrahi, 2024). This optimization reduces material waste and diminishes carbon emissions linked to manufacturing processes, so fostering a more sustainable production model. AI can enhance customer awareness and education on sustainable choices. Customized AI applications can suggest sustainable items according to user preferences and ecological effects, enabling consumers to make informed choices (Beccacece et al., 2024). AI promotes

responsible consumption by delivering real-time data on the sustainability attributes of products, motivating individuals to choose alternatives that conform to sustainable practices. Furthermore, AI technology can enhance the circular economy by optimizing recycling operations and electronic waste management. Artificial intelligence systems can effectively categorize and manage recyclable materials, enhancing recycling rates and diminishing landfill waste (World Economic Forum, 2024). The incorporation of AI in trash management fosters responsible production and consumption while advancing a more sustainable future.

### **6.1 Artificial Intelligence as a Genuine Tool for Alleviating Poverty**

Artificial intelligence (AI) can serve as a powerful instrument for poverty alleviation by enhancing economic opportunities and broadening access to essential services. AI plays a crucial role in alleviating poverty through its ability to analyze vast datasets, facilitating the identification of destitute areas and the optimization of resource allocation (Curto, 2024). Artificial intelligence can predict economic fluctuations and develop targeted social welfare programs that provide immediate support to vulnerable populations (UNDP, 2024). Moreover, artificial intelligence technology may improve the accessibility of financial services, particularly for underrepresented populations. AI-driven chatbots and mobile applications can deliver financial literacy education and connect individuals with microfinance institutions, thereby empowering them to start businesses and improve their quality of life (World Economic Forum, 2024). Financial inclusion is crucial as it can break the cycle of poverty by enabling individuals to invest in education, healthcare, and other essential needs. Artificial intelligence (AI) can enhance the provision of public services by streamlining processes and ensuring that aid reaches the most needy populations. The integration of artificial intelligence (AI) in automating administrative tasks and improving data management will significantly augment the operational efficiency of governments and NGOs, thereby optimizing the efficacy of poverty alleviation programs (IMF, 2024). AI possesses substantial potential to mitigate poverty by enhancing economic opportunities, increasing service accessibility, and optimizing resource allocation, thereby contributing meaningfully to sustainable development goals.

## 6.2 Ethical Dilemmas in Artificial Intelligence

As artificial intelligence (AI) progresses and becomes increasingly incorporated into diverse societal facets, numerous ethical dilemmas have arisen that necessitate meticulous examination. These difficulties encompass various domains, including privacy, bias, transparency, and the societal implications of AI systems. Let us thoroughly examine the challenges;

## 7. CONFIDENTIALITY AND DATA SAFEGUARDING

One of the primary ethical concerns about AI is the issue of privacy and data protection. Artificial intelligence systems often rely on vast amounts of data for optimal functionality, raising concerns around the collection, storage, and use of personal information (Gosselink et al., 2023). Concerns exist that artificial intelligence (AI) could be utilized to infringe upon human privacy rights, such as through the use of facial recognition technology or predictive analytics (UN, 2023). Ensuring that AI systems adhere to stringent data protection laws and maintain individual privacy rights is paramount.

### 7.1 Algorithmic Bias

A notable ethical concern is the potential for AI systems to perpetuate or exacerbate societal biases. AI algorithms are developed using data that may embody historical biases and inequality, resulting in biased decision-making and consequences (Frais, 2024). AI systems employed in hiring or loan approval processes may exhibit discrimination against specific groups based on attributes such as ethnicity, gender, or socioeconomic position (Gosselink et al., 2023). To address this, algorithmic bias necessitates meticulous evaluation of the data utilized for training AI systems and the establishment of protocols to guarantee equity and non-discrimination.

### 7.2 Clarity and Comprehensibility

The absence of openness and explainability in AI decision-making processes constitutes an additional ethical challenge. Numerous AI systems, especially those utilizing deep learning techniques, function as "black boxes," complicating the comprehension of their decision-making processes (Frais, 2024). The absence of transparency can erode trust in AI

systems and complicate the process of holding them accountable for their decisions (UN, 2023). Creating AI systems that exhibit greater transparency and explainability is essential for fostering confidence and guaranteeing responsible AI utilization.

### 7.3 Societal Impact and Displacement of Jobs

The anticipated job displacement resulting from AI automation poses a substantial ethical dilemma. The increasing sophistication and advanced capabilities of AI systems in executing jobs previously carried out by humans have raised worries regarding their effects on employment and the economy (Gosselink et al., 2023). Consequently, the responsibility of AI developers and companies to prevent the adverse effects of AI-driven employment displacement and ensure equitable distribution of AI benefits is called into question (Frais, 2024). Collaboration among policymakers and stakeholders is vital to tackle these issues and guarantee that the shift towards an economy propelled by artificial intelligence is guided by social responsibility. Rudra, (2023) asserts that although AI may result in job displacement, it also generates fresh employment prospects within the AI industry, indicating the necessity for policies that improve skills and enable transitions into new positions (Tiwari, 2023).

### 7.4 Autonomous Weapons and Lethal Autonomous Weapons Systems (LAWS)

The design and implementation of autonomous weapons and lethal autonomous weapons systems (LAWS) pose a highly worrisome ethical dilemma. The capacity of these systems to autonomously determine the application of deadly force, without significant human oversight, gives rise to concerns regarding the ethical aspects of combat, the inviolability of human life, and the possibility of causing undifferentiated damage (Gosselink et al., 2023). There is a growing need for a worldwide prohibition on the creation and utilization of laws, together with the implementation of explicit ethical principles and international legislation that regulate the use of autonomous weapons (UN, 2023). As artificial intelligence progresses and achieves more integration into society, it is imperative that we confront the ethical dilemmas that emerge. Key objectives include safeguarding privacy and data security, addressing algorithmic bias, fostering



openness and explainability, overseeing the societal consequences of AI, and regulating autonomous weapons. Effective resolution of these issues necessitates the cooperation of AI developers, policymakers, ethicists, and the general public to guarantee the responsible and ethical development and use of AI, therefore yielding societal benefits.

### **7.5 Adoption of Ai in Urban Waste Management in Developing Countries**

The implementation of Artificial Intelligence (AI) in urban trash management is progressively acknowledged as a revolutionary remedy for developing nations such as Nigeria, Ghana, and South Africa. These nations encounter substantial difficulties stemming from fast urbanization, insufficient infrastructure, and constrained resources, which intensify waste management problems (Nwokediegwu & Ugwuanyi, 2024). Artificial intelligence technology, including machine learning and Internet of Things applications, are being included to improve efficiency in waste collecting, sorting, and recycling processes (Solaja, 2024). In Nigeria, novel AI-powered smartphone applications enhance community involvement by allowing residents to report garbage hotspots, therefore enhancing local waste management initiatives (Adusei-Gyamfi et al., 2022). Ghana has initiated the deployment of sensor-equipped smart bins that enhance collection routes through real-time data analysis (Maphosa & Maphosa, 2020). South Africa is investigating AI methods to automate sorting procedures at recycling facilities, thereby substantially enhancing resource recovery rates (Ogundari & Awokuse, 2018). These AI apps not only aim to optimize operations but also encourage sustainable practices by facilitating recycling and minimizing environmental consequences. As these nations advance their technical infrastructures, the potential for AI to transform waste management becomes increasingly evident (Ogutu & Kathambi, 2023).

## **8. METHODOLOGY**

This paper examines the Role of Artificial Intelligence in Achieving Sustainable Development Goals: A Critical Review. This work is conceptual by nature. It used a table of random numbers to select five SDGs from the seventeen listed SDGs by the United Nation, 2015. A table of random numbers which is a

component of Simple Random Sampling was adopted to select a random sample from a population. It ensures randomness and minimizes bias in the selection process. The following SDGs were selected for critical review in tandem with artificial intelligence: The following SDGs (Poverty Reduction, reducing inequality, Cities and Communities, Decent work and economic growth, and Responsible Consumption and Production) were selected to ascertain how artificial intelligence has impacted on them.

## **9. RESULTS AND DISCUSSION**

**Findings from the reviewed literature are clearly slated hereunder:**

1. AI can improve resource efficiency and reduce wastages, particularly in relation to SDG 12(Responsible Consumption and Production), by optimizing supply chains and minimizing environmental footprints (Nahar, 2024).
2. AI technologies can process and analyse large volumes of data, enabling better-targeted policy measures and resource allocation to address challenges related to poverty (SDG 1) and inequality (SDG 10) (Rajaonson & Schmitt, 2024).
3. AI can contribute to SDG 11 (Sustainable Cities and Communities) by optimizing urban planning, improving public transport systems, and enhancing waste management practices (Marjan, 2023).
4. Many AI algorithms operate as "black boxes," making it difficult to understand how they arrive at their decisions. This lack of transparency and explainability can undermine trust in AI systems and make it challenging to hold them accountable for their actions.

## **10. CONCLUSION**

Artificial intelligence (AI) holds immense potential in accelerating progress towards the Sustainable Development Goals (SDGs), but its integration requires careful consideration of the associated challenges and risks. When leveraged responsibly, AI can enhance economic opportunities, improve public service delivery, and promote sustainable practices across various sectors. However, the adoption of AI also poses risks, such as perpetuating biases, machines replacing human efforts, exacerbating inequalities, and contributing to environmental degradation. To harness the transformative

power of AI for sustainable development, a multi-stakeholder approach is necessary, involving policymakers, researchers, civil society, and the private sector. This collaboration should prioritize developing robust governance frameworks, data management experts, ensuring algorithmic transparency and accountability, and promoting equitable access to AI technologies. By addressing these critical issues, stakeholders can unlock the full potential of AI in creating a more sustainable and equitable future.

## 11. POLICY RECOMMENDATIONS

- 1) Organizations need to wisely Prioritize AI applications that directly enable SDG targets: This can be achieved by identifying and prioritizing AI solutions that have the greatest potential to enable progress across multiple SDG targets, such as using AI for supply chain optimization, waste management, and sustainable product design to advance SDG 12 on responsible consumption and production.
- 2) AI need to be used to alleviate poverty through its ability to analyse vast amounts of data, which can help identify poverty-stricken areas and optimize resource allocation (Curto, 2024). AI can predict economic fluctuations and develop targeted social safety net programs that provide timely support to vulnerable populations (UNDP, 2024). AI technologies can facilitate access to financial services, particularly in underserved communities. AI-powered chatbots and mobile applications can offer financial literacy training and connect individuals with microfinance opportunities, empowering them to start businesses and improve their livelihoods (World Economic Forum, 2024). This financial inclusion is crucial for breaking the cycle of poverty, as it enables individuals to invest in education, healthcare, and other essential needs. AI can enhance public service delivery by streamlining processes and ensuring that aid reaches those who need it most.
- 3) Organizations need to use AI to resolve critical urban challenges by optimizing service delivery and enhancing the quality of life for residents. For example, predictive analytics can be used in public health to anticipate disease outbreaks, thereby enabling proactive measures to safeguard community health. The integration of AI is

also seen as a catalyst for economic growth because cities adopt AI technologies, they attract investments and foster innovation ecosystems that can lead to job creation and enhanced economic resilience.

- 4) Organizations need to proactively address ethical considerations, biases, and risks of AI systems that could inhibit SDG progress, such as perpetuating inequalities or causing job displacement. Develop robust governance frameworks to ensure AI is used responsibly and transparently.
- 5) Organizations must design and deploy AI solutions that specifically target the needs of underserved and marginalized communities and cities to reduce inequalities and leave no one behind in the pursuit of sustainable development.
- 6) The integration of AI in achieving the SDGs must be approached with caution to avoid biases and ensure ethical standards are met, as biased AI systems can exacerbate existing inequalities (Rajaonson & Schmitt, 2024).

## DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

## COMPETING INTERESTS

Author has declared that no competing interests exist.

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